

WHAT IS CLAIMED IS:

1. An interrupt controlling method of executing an interrupt process while
executing a first program, in which instructions for performing a task process are
5 described, said method comprising the steps of:
 - (a) when an interrupt request occurs while said first program, in which first and
second areas are defined, is in execution, suspending the execution of said first program
and setting at least one breakpoint in said second area;
 - (b) resuming the execution of said first program that has been suspended in said
10 step (a) after the setting of said breakpoint is completed;
 - (c) when the execution of said first program that has been resumed in said step
(b) reaches said breakpoint, suspending the execution of said first program and executing
said interrupt process; and
 - (d) clearing the setting of said breakpoint after the execution of said interrupt
15 process is completed.
2. The interrupt controlling method according to claim 1, wherein:
said at least one breakpoint includes a plurality of breakpoints;
said second area contains a plurality of branch instructions; and
20 in said step (a), said breakpoints are respectively set at a head address of said
second area, an end address of said second area, and a plurality of addresses in which said
plurality of branch instructions are stored.
3. The interrupt controlling method according to claim 1, wherein:
25 said at least one breakpoint includes a plurality of breakpoints;

said second area includes a plurality of branch instructions; and

said step (a) has the steps of:

(a-1) obtaining an address storing an instruction that was in execution at the time said first program was suspended;

5 (a-2) if said address belongs to said first area, setting said breakpoints only at a head address of said second area;

(a-3) if said address belongs to said second area, setting said breakpoints respectively at a head address of said second area, an end address of said second area, and a plurality of addresses thereof in which said plurality of branch instructions are stored.

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4. The interrupt controlling method according to claim 1, further comprising the step of:

(e) setting an interrupt process permission flag; and wherein:

15 if said interrupt process permission flag is set to “enable”, then execution of said first program is suspended and said interrupt process is executed without performing said steps (a) through (d) when said interrupt request occurs while said first program is in execution; and

said steps (a) through (d) are executed in a situation where said interrupt process permission flag is set to “disable”.

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5. The interrupt controlling method according to claim 1, wherein the process for setting said breakpoint has the steps of:

(x-1) saving a first instruction stored in a specific address at which said breakpoint is to be set; and

25 (x-2) writing into said specific address a second instruction for instructing

branching to a head address of a second program for executing said interrupt process.

6. The interrupt controlling method according to claim 5, wherein the process for clearing the setting of said breakpoint has the step of:

5 (y) replacing said second instruction stored in said specific address with said first instruction.

7. The interrupt controlling method according to claim 1, wherein the process for setting said breakpoint has the step of:

10 (x-1) setting, in a predetermined register, a specific address at which said breakpoint is to be set; and

the process for suspending the execution of said first program has the steps of:

(x-2) in a process of executing said first program, sequentially comparing an address set in a program counter with said specific address set in said predetermined
15 register; and

(x-3) setting, in said program counter, a head address of a second program for executing said interrupt process if said address set in said program counter matches said specific address set in said predetermined register.

20 8. The interrupt controlling method according to claim 7, wherein the process for clearing the setting of said breakpoint has the step of:

(y) clearing the setting of said predetermined register.

9. The interrupt controlling method according to claim 1, wherein the process for
25 setting said breakpoint has the step of:

(x) setting by using a simulator, in a predetermined variable, a specific address at which said breakpoint is to be set.

10. The interrupt controlling method according to claim 9, wherein the process for
5 clearing the setting of said breakpoint has the step of:

(y) clearing the setting of said predetermined variable.

11. An interrupt controlling method of executing an interrupt process while
executing a first program, in which instructions for performing a task process are
10 described, said method comprising the steps of:

(a) when an interrupt request occurs while said first program, in which first and
second areas are defined, is in execution, suspending execution of said first program and
obtaining an address that stores an instruction that was in execution at the time said first
program was suspended;

15 (b) setting a breakpoint in said second area if said address belongs to said first
area, but executing said interrupt process if said address belongs to said second area;

(c) subsequent to said step (b), resuming the execution of said first program that
has been suspended in said step (a);

20 (d) if said address belongs to said first area in said step (b), suspending
execution of said first program and executing said interrupt process when the execution
of said first program that has been resumed in said step (c) reaches said breakpoint; and

(e) clearing the setting of said breakpoint after the execution of said interrupt
process in said step (d) is completed.

25 12. The interrupt controlling method according to claim 11, wherein, in said step

(b), said breakpoint is set at only at a head address of said second area.

13. The interrupt controlling method according to claim 11, further comprising the step of:

5 (f) setting an interrupt process permission flag; and wherein:

if said interrupt process permission flag is set to “enable”, then execution of said first program is suspended and said interrupt process is executed without performing said steps (a) through (e) when said interrupt request occurs while said first program is in execution; and

10 said steps (a) through (e) are executed if said interrupt process permission flag is set to “disable”.

14. The interrupt controlling method according to claim 11, wherein the process for setting said breakpoint has the steps of:

15 (x-1) saving a first instruction stored in a specific address at which said breakpoint is to be set; and

(x-2) writing into said specific address a second instruction for instructing branching to a head address of a second program for executing said interrupt process.

20 15. The interrupt controlling method according to claim 14, wherein the process for clearing the setting of said breakpoint has the step of:

(y) replacing said second instruction stored in said specific address with said first instruction.

25 16. The interrupt controlling method according to claim 11, wherein the process for

setting said breakpoint has the step of:

(x-1) setting, in a predetermined register, a specific address at which said breakpoint is to be set; and

the process for suspending the execution of said first program has the steps of:

5 (x-2) in a process of executing said first program, sequentially comparing an address set in a program counter with said specific address set in said predetermined register; and

(x-3) setting, in said program counter, a head address of a second program for executing said interrupt process if said address set in said program counter matches said
10 specific address set in said predetermined register.

17. The interrupt controlling method according to claim 16, wherein the process for clearing the setting of said breakpoint has the step of:

(y) clearing the setting of said predetermined register.

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18. The interrupt controlling method according to claim 11, wherein the process for setting said breakpoint has the step of:

(x) setting by using a simulator, in a predetermined variable, a specific address at which said breakpoint is to be set.

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19. The interrupt controlling method according to claim 18, wherein the process for clearing the setting of said breakpoint has the step of:

(y) clearing the setting of said predetermined variable.

25 20. An interrupt controlling method of executing an interrupt process while

executing a program, in which instructions for performing a task process are described, said task process including a process of loading a predetermined variable into a register and a process using said register, said method comprising the steps of:

5 (a) when an interrupt request occurs while said program, in which first and second areas are defined, is in execution, suspending said program and obtaining an address that stores an instruction that was in execution at the time said program was suspended;

(b) if said address belongs to said second area, executing an interrupt process;
and

10 (c) if said address belongs to said first area, replacing said predetermined variable with content of said register and executing an interrupt process using said predetermined variable that has been replaced.